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THE IMPACT OF COOPERATIVE COMPETITIVE AND
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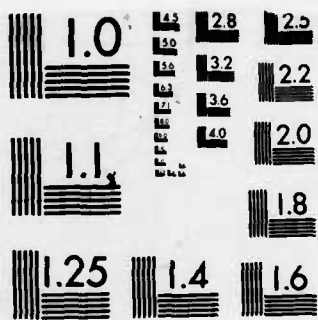
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**THE IMPACT OF COOPERATIVE, COMPETITIVE,
AND INDIVIDUALISTIC EXPERIENCES ON MINORITY INDIVIDUALS'
EDUCATIONAL AND CAREER SUCCESS**

AD-A142 228

David W. Johnson and Roger T. Johnson
University of Minnesota
202 Pattee Hall
Minneapolis, MN 55455

ONR/CNET
Basic Research Meeting on
Minorities Entering High Tech Careers
Pensacola, Florida
February 15-17, 1984

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summarized in this paper. There is considerable evidence that cooperative, compared with competitive and individualistic, learning experiences promote higher achievement, the development of critical thinking competencies and higher level reasoning strategies, the acquisition of positive attitudes toward subject areas such as math and science required to enter high tech careers, the interpersonal skills needed to work effectively with other people and engage in group problem-solving activities, and the psychological health and self-confidence required to succeed within a career setting. In addition, the relationships formed within cooperative learning groups provide an interpersonal network that directly relates to career opportunities and advancement.

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University of Minnesota

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ABSTRACT

THE IMPACT OF COOPERATIVE, COMPETITIVE, AND INDIVIDUALISTIC LEARNING EXPERIENCES ON SUCCESS IN COLLEGE AND CAREER

David W. Johnson and Roger T. Johnson

University of Minnesota

The way in which academic learning experiences are structured determines to a large extent the success of minority students in college and in their later careers. There are three ways in which learning experiences may be structured: cooperatively, competitively, and individualistically. For the past ten years the authors have conducted an extensive research program, developed a number of theoretical models, and systematically reviewed the literature comparing the efficacy of the three goal structures. The results of these efforts are summarized in this paper. There is considerable evidence that cooperative, compared with competitive and individualistic, learning experiences promote higher achievement, the development of critical thinking competencies and higher level reasoning strategies, the acquisition of positive attitudes toward subject areas such as math and science required to enter high tech careers, the interpersonal skills needed to work effectively with other people and engage in group problem-solving activities, and the psychological health and self-confidence required to succeed within a career setting. In addition, the relationships formed within cooperative learning groups provide an interpersonal network that directly relates to career opportunities and advancement.

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THE VALUE OF A COLLEGE EDUCATION

Educational attainment (the total number of years of schooling completed) is perhaps the single most important determinant of occupational attainment (Thomas & Gordon, 1983). The major fields that students pursue do, however, affect the economic returns of education (Thomas, 1980). Students who aspire to and prepare themselves for careers in the natural sciences, business, and math-related fields such as engineering, computer sciences, physics, and mathematics, earn higher salaries and enter more economically rewarding occupations than do students who pursue the social sciences and other more traditional careers (Vetters, 1977; Metz, Stafford, & Hammer, 1981; College Placement Council, 1982). Minority students have been under-represented in training programs for these higher paying fields (Brown & Stent, 1977; Gurin & Epps, 1975; Thomas, 1980).

Minority students enter two-year and junior colleges at considerably lower rates than do whites and their continuation rates are still far short of comparable rates for whites (Austin, 1982; Trent, McPartland, & Thomas, 1982). Between 1975-1976 and 1980-1981 the minority share of all bachelor degrees increased by only one percent and black males decreased in their share of all degrees (Trent, 1983). Within engineering, freshman enrollment by black students decreased by 4 percent from 1981 to 1982

although there was an increase of almost 14 percent at the graduate level (Doigan, 1983). Hispanic freshman enrollment decreased by over 6 percent and graduate enrollment decreased slightly. The freshman enrollment of Asian/Pacific Islander students increased by about 4 percent and full-time graduate enrollment increased almost 14 percent. There are almost no American Indians enrolled in engineering programs, accounting for less than 0.5 percent of full-time undergraduate enrollment and 5 percent of the total minority enrollment.

A primary factor in determining whether students choose math-based or natural science majors in college is adequate high school math training (Sells, 1980; Sherman & Fennema, 1977; Thomas, 1981, 1983). Liking for math seems to be the single most important predictor of taking advanced high school math courses (Thomas, 1983).

To gain economic parity, minority individuals need to take advanced math and science courses in high school, enroll in math- and science-related college programs, successfully complete the instructional program and receive a degree, while developing the basic technical and collaborative competencies needed for career advancement.

VOLUNTARY PERSISTENCE OF MEMBERSHIP

The major factors that determine whether minority individuals voluntarily continue their membership in or drop out of an educational or career organization include:

1. Social integration into relationships with peers and faculty/superiors.

2. Commitment to the organization's goals and to the organization itself.
3. High motivation to achieve.
4. High achievement reflected in the mastery of theories, facts, and information and the application of knowledge in completing projects.
5. Use of high level analytical reasoning strategies.
6. Ability to utilize one's knowledge and resources in collaborative activities with colleagues.
7. Social networking and coalition formation with other ambitious and successful individuals.
8. Psychological health, stability, and well-being required to participate effectively within an organization and our society.

Whether these eight requirements for academic and career success occur or not depends to a large extent on the way in which the goals of the organizational members are interdependent.

DEFINITIONS

Deutsch (1949, 1962) conceptualized three types of goal interdependence: cooperative, competitive, and individualistic. A cooperative social situation exists when the goals of the separate individuals are so linked together that there is a positive correlation among their goal attainments. An individual can obtain his or her goal only if the other participants can obtain their goals. Thus a person seeks an outcome that is beneficial to all those with whom he or she is cooperatively linked. A competitive social situation exists when the goals of the separate individuals are so

linked that there is a negative correlation among their goal attainments. An individual can obtain his or her goal only if the other participants cannot obtain their goals. Thus a person seeks an outcome that is personally beneficial but is detrimental to the others with whom he or she is competitively linked. Finally, an individualistic social situation exists when there is no correlation among the goal attainments of the participants. Whether an individual accomplishes his or her goal has no influence in whether individuals achieve their goals. Thus, a person seeks an outcome that is personally beneficial, ignoring as irrelevant the goal achievement efforts of other participants in the situation.

Within colleges, courses and class sessions may be structured cooperatively, competitively, or individualistically. Within career organizations there is usually a mixture of cooperative, competitive, and individualistic elements, but in order for the organization to be effective, the cooperative elements need to dominate.

OUR RESEARCH PROGRAM

For the past twelve years we have been conducting a program of research on the relative impact of cooperative, competitive, and individualistic experiences on the eight (as well as other) variables listed above. Our pattern of activities have been to develop a theoretical model, conduct a series of studies to validate the theory, and conduct large-scale meta-analyses of all the existing relevant studies.

Basically we choose to conduct highly controlled field-experimental studies in actual classrooms and schools. Our typical study lasted three weeks, compared cooperative learning situations with individualistic and/or

competitive learning situations, and involved students from different ethnic groups and ability levels. We typically obtained the help of three classroom teachers who agreed to assist us in conducting the study. In order to ensure that there were no differences among students in each condition we randomly assigned students, making sure that there were an equal number of males and females, majority and minority, and high, medium, and low ability students in each condition. To make sure that the high quality teaching occurred in each condition, the teachers received a minimum of 90 hours of training on how to implement cooperative, competitive, and individualistic learning situations and were given a daily script to follow. In order to make sure that any differences among conditions we found were not due to differences in teaching ability, the teachers were rotated across conditions, so that each teacher taught each condition for one week. To make sure that the study did in fact test our theory, the ways we implemented cooperative, competitive, and individualistic learning were carefully structured to be unambiguous. To make sure that any differences among conditions we found were not due to differences in curriculum materials, the students studied the identical curriculum. To verify that the teachers were in fact teaching the conditions appropriately, we observed them daily. Finally, we collected observations of how students interacted with each other. We were determined to conduct our research in as highly controlled and careful a way as possible so we could be confident about the results. What follows is a summary of our theory and research and a brief description of the meta-analysis we conducted to help test the theory.

SOCIAL INTEGRATION

A major factor determining whether minority individuals voluntarily continue their membership in or drop out of an educational or career organization is whether they are integrated into the social system of the organization (Durkheim, 1961; Tinto, 1975). Insufficient interaction with other organizational members is a major reason given for dropping out. Social isolation is definitely related to dissatisfaction with education in technical fields such as engineering (Lantz, 1982). It is the quality and intimacy of relationships within the organization, not their numbers that seem to determine integration. Peer group associations appear to be most directly related to individual social integration (Tinto, 1975). Other potential sources of social integration, extracurricular activities and faculty interactions, appear to be of approximately equal secondary importance.

A number of studies have demonstrated that social integration via friendship support is directly related to persistence in college (Tinto, 1975). Absence of any such supportive groups or subcultures is more often associated with voluntary withdrawal than it is with dismissal. Academically successful students who withdraw from college score significantly lower on measures of social relationships than do either persisters or academic dismissals. It may be argued that when academic and social systems coalesce (establishing friendships with academically-oriented peers), and students have opportunities for both social interaction and mutual assistance, there is the most success in college.

There are minority admissions counselors and personnel directors

who believe that minority individuals have to practice biculturalism in order to function successfully within educational and career organizations (West, 1983). From this point of view minority individuals suffer from cultural displacement on first arrival to an educational or career organization and, therefore, social integration becomes of immediate importance. Minority students require a sense of belonging within the college community as soon as possible. Relationships with white as well as minority colleagues and superiors are usually helpful for educational and career success.

When minority individuals enter math- and natural-science-related college training programs, and when they enter a high tech career, they are usually in immediate proximity with white colleagues. Whether the proximity between minority individuals and other students or employees leads to positive or negative relationships depends on the way in which the situations in which they initially interact are structured.

CONDITIONS LEADING TO POSITIVE OR NEGATIVE RELATIONSHIPS

Building on the previous theorizing of Deutsch (1949, 1962) we posited that depending on whether interaction takes place within a context of positive, negative, or no goal interdependence, a process of acceptance or rejection takes place (D. Johnson, Johnson, & Maruyama, 1983). The process of acceptance (see Figure 1) results from interaction within a context of positive goal interdependence, which leads to:

1. Promotive interaction
2. Feelings of psychological acceptance
3. Accurate perspective taking
4. Differentiated (taking into account many different character-

istics), dynamic (being modified from situation to situation), realistic views of collaborators and oneself

5. Psychological success
6. Basic self-acceptance and high self-esteem
7. Positive cathexis toward collaborators
8. Expectations of rewarding future interactions with collaborators

The process of rejection (see Figure 1) results from interaction within a context of negative or no goal interdependence. Negative goal interdependence promotes oppositional interaction and no goal interdependence results in no interaction with peers. Both lead to feelings of psychological rejection; inaccurate perspective-taking; monopolistic, static, and stereotyped views of classmates; psychological failure; contingent self-acceptance or basic self-rejection; negative or no cathexis toward classmates; and expectations of distasteful and unpleasant interaction with classmates. With further interaction, the process of acceptance or rejection may be repeated.

SOCIAL INTERDEPENDENCE AND INTERPERSONAL ATTRACTION

The basic proposition of the theoretical model is that the type of goal interdependence used to structure classroom learning determines whether interpersonal attraction or rejection results among students. The validity of this proposition must first be examined before the proposed mediating variables are reviewed. Our research has focused on and examined the relative impact of the three types of social interdependence on relationships (1) among homogeneous samples, (2) between ethnic minority and majority students, and (3) between handicapped and nonhandicapped students.

Our colleagues and ourselves have conducted a number of studies that indicate that cooperative learning experiences, compared with competitive and individualistic ones, promote more interpersonal attraction among students (Garibaldi, 1979; D. Johnson & Johnson, 1972; Tjosvold & Johnson, 1978; Tjosvold, Johnson, & Johnson, 1982). In addition, we have conducted a number of large scale surveys that indicate that cooperativeness is positively related to liking for other students while competitiveness and positive attitudes toward individualistic learning situations are not (Gunderson & Johnson, 1980; D. Johnson & Ahlgren, 1976; D. Johnson, Johnson, & Anderson, 1978). We also found evidence that cooperative learning experiences, compared with individualistic ones, promote more positive attitudes toward heterogeneous peers (D. Johnson & Johnson, 1983; D. Johnson, Johnson, & Scott, 1978).

Our next series of studies found that cooperative learning experiences, compared with competitive or individualistic ones, promoted greater interpersonal attraction between ethnic minority and majority students (Cooper, Johnson, Johnson, & Wilderson, 1980; D. Johnson & Johnson, 1981a, 1982a, 1984a; D. Johnson, Johnson, Tiffany, & Zaidman, 1983; S. Johnson & Johnson, 1972; Warring, Johnson, Maruyama & Johnson, 1984). Finally, we have conducted a series of studies demonstrating that cooperative learning experiences promote greater interpersonal attraction among handicapped and nonhandicapped students than do competitive or individualistic learning experiences (Armstrong, Johnson, & Balow, 1981; Cooper, Johnson, Johnson, & Wilderson, 1980; D. Johnson & Johnson, 1981b, 1982a, 1982b, 1982c, 1984b, in press-b; D. Johnson, Johnson, Pierson, & Lyons, 1983; R. Johnson &

Johnson, 1981, 1982a, 1982b; R. Johnson, Johnson, & Scott, & Ramolae, 1984; R. Johnson, Johnson, DeWeerd, Lyons, & Zaidman, 1982; R. Johnson, Rynders, Johnson, Schmidt, & Haider, 1979; Martino & Johnson, 1979; Nevin, Johnson, & Johnson, 1982; Rynders, Johnson, Johnson, & Schmidt, 1980; Smith, Johnson, & Johnson, 1982; Yager, Johnson, Johnson, & Snider, 1984).

While the above studies represent considerable validation of the basic proposition of our theoretical model, there remained the need to verify that other researchers were finding similar results. Research reviews commonly examine only subsets of the existing studies, allowing different reviewers to come up with contradictory conclusions. The use of the summary-impression method of reviewing literature has been severely criticized recently. We recently completed, therefore, a meta-analysis of all existing research on the relative impact of cooperative, cooperative with intergroup competition, interpersonal competitive, and individualistic learning experiences on interpersonal attraction among homogeneous and heterogeneous samples of students (D. Johnson, Johnson, & Maruyama, 1983). We reviewed 98 studies conducted between 1944 and 1982 that yielded 251 findings. Three types of meta-analysis procedures were used: voting method, effect-size method, and z-score method. The results of all three analyses provide strong validation for the proposition that cooperative learning experiences, compared with competitive or individualistic ones, promote greater interpersonal attraction among homogeneous students, students from different ethnic groups, and handicapped and nonhandicapped students.

PROCESSES OF ACCEPTANCE AND REJECTION

Our theoretical model posits that there are a number of variables that partially explain the relationship between cooperative, competitive, and individualistic learning experiences and interpersonal attraction.

The work of a number of social scientists indicates that:

1. The more promotive (as opposed to oppositional or no) interaction among students, and the more students facilitate (as opposed to frustrate or ignore) each other's goal achievement, the greater resulting interpersonal attraction.
2. The greater one's conviction that others are encouraging, supporting, and accepting one's efforts to achieve, the greater the interpersonal attraction.
3. The more accurate one's perspective-taking, the greater one's empathy with, understanding of, and altruism for others, which results in greater interpersonal attraction.
4. The more realistic, dynamic, and differentiated (as opposed to monopolistic, static, and stereotyped) one's perceptions of others, the more one likes and identifies with them.
5. The higher one's self-esteem, the less one's prejudices against and the higher one's acceptance of and liking for others.
6. The greater one's academic and psychological success, the more one likes those who have contributed to and facilitated that success.
7. The more one expects future interactions to be positive and productive, the more one likes others.

Insert Figure 1; Tables 1 and 2 About Here

Thus, it may be assumed that the more cooperative experiences tend to promote the occurrence of these variables, the greater the resulting interpersonal attraction among students.

PROMOTIONAL VS. OPPOSITIONAL OR NO INTERACTION

One reason why cooperative experiences may promote more interpersonal attraction among students than do competitive or individualistic experiences is that within cooperative situations participants benefit from facilitating each other's efforts to achieve, while in competitive situations participants benefit from obstructing each other's efforts to achieve, and in individualistic situations the success or failure of others is irrelevant. The specific research is reviewed in the achievement motivation section of this chapter.

PERCEIVED PEER SUPPORT AND ACCEPTANCE

Cooperative learning experiences, compared with competitive and individualistic ones, have been found to result in stronger beliefs that one is personally liked, supported, and accepted by other students, that other students care about how much one learns, and other students want to help one learn. The specific research is reviewed in the achievement motivation section of this chapter.

ACCURACY OF PERSPECTIVE-TAKING

Social perspective-taking is the ability to understand how a situation appears to another person and how that person is reacting cognitively and emotionally to the situation. The opposite of perspective-taking is egocentrism, the embeddedness in one's own viewpoint to the extent

that one is unaware of other points of view and of the limitations of one's perspective. A number of studies have found that cooperativeness is positively related to the ability to take the emotional perspective of others (D. Johnson, 1975a, 1975b). Cooperative learning experiences have been found to promote greater cognitive and affective perspective-taking than do competitive or individualistic learning experiences (D. Johnson & Johnson, 1982b, 1982d; D. Johnson, Johnson, Johnson, & Anderson, 1976; D. Johnson, Johnson, Pierson, & Lyons, 1983; R. Johnson & Johnson, 1981; Lowry & Johnson, 1981; Smith, Johnson, & Johnson, 1981; Tjosvold & Johnson, 1978; Tjosvold, Johnson, & Johnson, 1982).

DIFFERENTIATION OF VIEW OF OTHERS

Stereotypes usually focus on only a few characteristics of a person and remain unchanged from situation to situation. Armstrong, Johnson, & Balow (1981) and R. Johnson, Johnson, Scott, and Ramolae (1984) found a more differentiated view of handicapped peers resulting from a cooperative, compared with an individualistic learning experience. Ames (1981) found that within a cooperative situation participants seemed to have a differentiated view of collaborators and tended to minimize perceived differences in ability and view all collaborators as being equally worthwhile, regardless of their performance level or ability. Students in the competitive situation tended to focus primarily on differences in ability in their evaluations of each other (a monopolistic, static, and stereotyped view), and they tended to perceive the nonwinners as being less deserving of reward. D. Johnson, Johnson, & Scott (1978) found that when given a choice of future collaborators, low achievers were picked by classmates just as frequently as high achievers, indicating that cooperative experiences promoted a differentiated view of classmates.

SELF-ESTEEM

Cooperative learning experiences, compared with competitive and individualistic ones, tend to promote higher levels of self-esteem and healthier processes for deriving conclusions about one's self-worth (Gunderson & Johnson, 1980; D. Johnson & Ahlgren, 1976; D. Johnson & Johnson, 1982c; D. Johnson, Johnson, & Anderson, 1978; D. Johnson, Johnson, & Scott, 1978; D. Johnson, Johnson, Tiffany, & Zaidman, 1983; D. Johnson & Norem-Hebeisen, 1977; R. Johnson & Johnson, 1981; R. Johnson, Johnson, DeWeerd, Lyons, & Zaidman, 1982; R. Johnson, Bjorkland, & Krotee, 1982; K. Johnson, Johnson, & Rynders, 1981; Nevin, Johnson, & Johnson, 1982; Norem-Hebeisen & Johnson, 1981; Smith, Johnson, & Johnson, 1982; Yager, Johnson, Johnson, & Snider, 1984). Norem-Hebeisen and Johnson (1981) found that cooperativeness tended to be related to basic self-acceptance and positive self-evaluation compared to peers, competitiveness tended to be related to conditional self-acceptance, and positive attitudes toward individualistic situations tended to be related to basic self-rejection.

ACADEMIC SUCCESS

Cooperative learning experiences tend to promote higher achievement than do competitive or individualistic ones (D. Johnson, Maruyama, Johnson, Nelson, & Skon, 1981). Such success has been found to be related to interpersonal attraction among collaborators (D. Johnson, Johnson, & Maruyama, 1983). This evidence is reviewed in more detail later in this chapter.

EXPECTATIONS TOWARD FUTURE INTERACTION

The final aspect of the process of acceptance is that it promotes

expectations toward rewarding and enjoyable future interaction among students. The final aspect of the process of rejection is that it promotes expectations toward negative, frustrating, and unpleasant future interaction among students. Both affect interpersonal attraction (D. Johnson & Johnson, 1972).

GENERALIZATION TO FREE-TIME SITUATIONS

Even though students express liking for each other during instructional situations, there is a need to determine whether these relationships will generalize to post-instructional, free-choice situations in which students can interact with whomever they wish. A number of recent studies have demonstrated that when students were placed in post-instructional, free-choice situations there was more cross-ethnic interaction (D. Johnson & Johnson, 1981a, 1982a; D. Johnson, Johnson, Pierson, & Lyons, 1983; D. Johnson, Johnson, Tiffany, & Zaidman, 1983, in press; Warring, Johnson, Maruyama, & Johnson, 1984) and more cross-handicap interaction (D. Johnson & Johnson, 1981b, 1982c, 1982d; R. Johnson & Johnson, 1981, 1982a, 1982b; R. Johnson, Johnson, DeWeerd, Lyons, & Zaidman, 1982; Martino & Johnson, 1979) when students had been in a cooperative rather than a competitive or individualistic learning situation. In other words, the relationships formed within cooperative learning groups do generalize to post-instructional situations.

RELATIONSHIPS WITH SUPERIORS

Cooperative learning experiences not only affect relationships with peers, they also affect relationships with superiors. The more favorable students' attitudes toward cooperation, the more they believe that teachers, teacher aides, counselors, and principals are important and positive; that teachers care about and want to increase stu-

dents' learning: that teachers like and accept students as individuals. and that teachers and principals want to be friends with students (Gunderson & Johnson, 1980; D. Johnson & Ahlgren, 1976; D. Johnson, Johnson, & Anderson, 1978). These findings hold in elementary, junior high, and senior high schools in rural, suburban, and urban school districts. In suburban junior and senior high schools, student competitiveness becomes positively related to perceptions of being liked and supported personally and academically by teachers. Individualistic attitudes are consistently unrelated to attitudes toward school personnel. There are also several field experiments that demonstrate that students participating in cooperative learning experiences, compared with competitive and individualistic ones, like the teacher better and perceive the teacher as being more supportive and accepting academically and personally (D. Johnson & Johnson, 1983; D. Johnson, Johnson, Johnson, & Anderson, 1976; D. Johnson Johnson, & Scott, 1978; R. Johnson, Bjorkland, & Krotee, 1982; R. Johnson, Johnson, & Tauer, 1979; R. Johnson, Johnson, & Rynders, 1981; Tjosvold, Marino, & Johnson, 1977; Wheeler & Ryan, 1973; Yager, Johnson, Johnson, & Snider, 1984).

COMMITMENT TO ORGANIZATIONAL GOALS

A second factor influencing whether minority individuals will persist in or voluntarily drop out of an educational or career organization is their commitment to the organization's goals and to the organization itself (Durkheim, 1961; Tinto, 1975). Within educational organizations minority students must be committed to the goal of college completion and feel a personal identification with the school. Mowday, Porter, and Steers (1982) have identified organizational commitment as being a prime determinant of

turnover. Organizational commitment is defined as a syndrome of variables such as belief in the organization's goals, willingness to work on the organization's behalf, and intention to maintain membership in the organization. The greater minority individuals' organizational commitment, the more likely they are to complete college training programs and develop a successful career progression pattern.

There is a relationship between social integration into the organization and organizational commitment. If minority individuals' organizational commitment is low, then continuation of membership in the organization is based on the extent to which they are socially integrated. A basic level of performance is necessary, however, to maintain membership. If minority individuals' organization commitment is high, then their membership may be maintained despite a lack of social integration. Lack of social integration, however, may result in being dismissed from a career organization no matter how high the organizational commitment may be. A basic level of collaborative skills and social integration is necessary to maintain membership in a career organization.

Organizational commitment is based in part on the attitudes minority individuals develop toward high tech subject areas such as math and science and projects. Positive attitudes toward math and science need to be developed in order for minority individuals to take advanced math and science courses in high school, enter math- and science-related careers, and enjoy their work in high tech fields. Cooperative learning experiences, compared with competitive and individualistic ones, promote more positive attitudes toward the subject area being studied and the instructional experience (Blanchard, Weigel, & Cook, 1975; Bryant, Crockenberg,

& Wilce, 1974; Crombag, 1966; Deutsch, 1949a; DeVries, Edwards, & Wells, 1974; DeVries & Mescon, 1975; Dunn & Goldman, 1966; Edwards & DeVries, 1972, 1974; Garibaldi, 1979; Gunderson & Johnson, 1980; Haines & McKeachie, 1967; Hammond & Goldman, 1961; D. Johnson, Johnson, Pierson, & Lyons, 1984; D. Johnson, Johnson, & Skon, 1979; R. Johnson, 1974; R. Johnson & Johnson, 1979; Lowry & Johnson, 1981; Raven & Eachus, 1963; Smith, Johnson, & Johnson, 1981a; Wheeler, 1977; Wheeler & Ryan, 1973). Most individuals, furthermore, prefer cooperative over competitive and individualistic experiences (D. Johnson & Johnson, 1976; D. Johnson, Johnson, Johnson, & Anderson, 1976; R. Johnson, 1976; R. Johnson, Johnson, & Bryant, 1973; R. Johnson, Ryan, & Schroeder, 1974).

MOTIVATION TO ACHIEVE

Building on the previous theorizing of Deutsch (1949b, 1962) it may be posited that depending on whether interaction takes place within a context of positive, negative, or no interdependence, different interaction patterns will result, causing different motivational systems, which in turn affect achievement differentially, which determines the expectations for future achievement (see Figure 2).

Insert Figure 2 About Here

The theoretical model posits that there are a number of variables that partially explain the relationship between cooperative, competitive, and individualistic learning experiences and achievement motivation:

1. Positive goal interdependence tends to result in promotive interaction among individuals, negative goal interdependence tends to result in oppositional interaction among individuals,

and no goal interdependence tends to result in an absence of interpersonal interaction.

2. Promotive interaction is characterized by giving and receiving help, being encouraged and encouraging others to achieve, and positive interpersonal interaction. It tends to result in:
 - a. Intrinsic motivation based on enjoyment of learning, benefitting others, and supportive feedback from peers.
 - b. High expectations for success based on multi-dimensional view of one's own and others' competencies, one's own and others' efforts committed to achievement, and the previous achievement history of the group.
 - c. Incentives for achievement based on mutual benefit, awareness of a common fate, awareness of mutual causation and mutual responsibility to contribute, and expectation of a joint celebration and joint pride in performance.
 - d. Epistemic curiosity and continuing interest in learning based on intellectual challenge and jointly searching for the best conceptualization of the issue being discussed.
 - e. Positive attitudes toward the subject being studied and the achievement-oriented activities based on the interpersonal interchange, mutual support and respect, and sense of accomplishment.
 - f. Task persistence based on all the above factors.
3. Oppositional interaction is characterized by discouraging and obstructing others' efforts to achieve. It tends to result in:
 - a. Extrinsic motivation based on winning and benefitting at

the expense of others.

- b. Expectations of success or failure based on a monopolistic comparison of own and others' academic ability with one's effort being of little importance if others are more academically able, and on one's history of performing higher or lower than one's competitors.
 - c. Incentives for achievement based on differential benefit, negatively linked fate, relative causation, relative identity, and a negatively linked celebration.
 - d. A lack of epistemic curiosity or continuing interest in learning more about the topic being studied based on feeling threatened by other points of view and a closed-minded justification of one's initial conclusions.
 - e. Negative attitudes toward the material being studied based on the obstruction of each others' work, the interpersonal dislike generated, and the feelings of failure experienced by all but the winner.
 - f. A lack of persistence in completing tasks due to the above factors.
4. No interaction among individuals while they work on achievement-oriented tasks results in:
- a. Extrinsic motivation based on achieving to benefit only oneself.
 - b. Expectations for success or failure based on a monopolistic view of one's academic ability, one's effort to achieve (which is irrelevant if one does not have the ability),

and one's achievement history.

- c. Incentives for achievement based on working for self-benefit, individual fate, self-caused outcomes, self-identity, and an individual celebration if one succeeds.
 - d. A lack of epistemic curiosity and continuing interest in learning more about the topic being studied based on cognitive fixation and a lack of intellectual challenge.
 - e. Negative attitudes toward the subject being studied based on social isolation and its corresponding boredom.
 - f. Lack of persistence in completing assigned tasks based on the above factors.
6. Higher achievement in cooperative than competitive or individualistic learning situations based on the above motivational systems.
7. The high achievement and attributions ascribing success to the joint competencies and effort of oneself and one's collaborators creates the expectation of success in future achievement situations in cooperative situations, while there is a low expectation for future success in competitive and individualistic learning situations for all but the most academically intelligent individuals.

PROMOTIVE, OPPOSITIONAL, AND NO INTERACTION

Positive, negative, and no goal interdependence result in three quite distinct interaction patterns among individuals. Promotive interaction may be defined as individuals encouraging and facilitating each other's

efforts to achieve. Oppositional interaction may be defined as individuals discouraging and obstructing each other's efforts to achieve. No interaction exists when individuals work independently without any interchange with one another.

PROMOTIVE INTERACTION

Promotive interaction includes being encouraged to achieve by one's peers, encouraging the academic achievement of one's collaborators, giving and receiving academic tutoring and help, and behaving in ways that facilitate the achievement of one's peers. Students typically perceive much more peer encouragement and support for achievement in cooperative than in competitive and individualistic learning situations (Deutsch, 1949b; DeVries & Edwards, 1974; DeVries, Edwards, & Wells, 1974; DeVries, Muse, & Wells, 1971; Garibaldi, 1976; Hulten, 1974; Spilerman, 1971; D. Johnson & Johnson, 1981a, 1981b, 1982a, 1982b, 1982c, 1983a, 1984a, 1984b; D. Johnson, Johnson, & Anderson, 1983; D. Johnson, Johnson, Johnson, & Anderson, 1976; D. Johnson, Johnson, Roy & Zaidman, 1984; D. Johnson, Skon, & Johnson, 1980; D. Johnson, Johnson, Tiffany, & Zaidman, 1984; R. Johnson, Bjorkland, & Krotee, 1984; R. Johnson & Johnson, 1981, 1982, 1983; R. Johnson, Johnson, Scott, & Ramolae, 1984; R. Johnson, Rynders, et al., 1979; Martino & Johnson, 1979; Nevin, Johnson, & Johnson, 1982; Rynders, Johnson, Johnson, & Schmidt, 1980; Skon, Johnson, & Johnson, 1980; Smith, Johnson, & Johnson, 1982; Tjosvold, Marino, & Johnson, 1977; Yager, Johnson, Johnson, & Snider, 1984). Cooperative attitudes, furthermore, are related to wanting to listen to, help, and do schoolwork with other students (Johnson & Ahlgren, 1976; D. Johnson, Johnson, & Anderson, 1978).

While the research has focused primarily on students' perceptions of their peers encouraging the students to achieve, there is reason to believe that encouraging one's collaborators to achieve may have more impact on one's achievement motivation than will being encouraged by others to achieve. Actively engaging in encouraging and facilitative behavior is a public commitment to group productivity. Such public commitment makes students less open to attempts at persuading them to lower their efforts to achieve and more open to attempts at persuading them to increase their efforts to achieve (Freedman & Fraser, 1966; Halverson & Pallak, 1978; Kiesler, 1971; Pallak, Mueller, Dollar, & Pallak, 1972; Sullivan & Pallak, 1976). In addition, actively encouraging others to achieve and actively facilitating their success makes the importance of contributing to the group's success more salient and less easily denied or forgotten in subsequent situations (Kiesler, 1971; Pallak, Mueller, Dollar, & Pallak, 1972; Pallak, Sogin, & VanZante, 1974; Wicklund & Brehm, 1976). Taking a public stand for group productivity will clearly increase the achievement oriented behavior of students (Pallak, Cook, & Sullivan, 1980).

There are consistent perceptions of more frequent helping and tutoring (including cross-ethnic and cross-handicap helping) in cooperative than in competitive or individualistic learning situations (Armstrong, Johnson, & Balow, 1981; Cooper, Johnson, Johnson, & Wilderson, 1980; DeVries & Mescon, 1975; DeVries, Mescon, & Shackman, 1976; Edwards & DeVries, 1974; D. Johnson & Johnson, 1981a, 1981b, 1982a, 1982b, 1983a, 1984a; D. Johnson, Johnson, Tiffany, & Zaidman, 1983; R. Johnson & Johnson, 1982).

There are a number of studies that have observed actual interaction among students. There is evidence that there are more positive remarks in cooperative than in competitive or individualistic learning situations (R. Johnson, Rynders, Johnson, Schmidt, & Haider, 1979; Rynders, Johnson, Johnson, & Schmidt, 1980). A number of studies have found more peer encouragement and support for academic effort and actual facilitation of other students' learning in cooperative than in competitive and individualistic learning situations (Hanelin, 1978; D. Johnson & Johnson, 1981b, 1984a, 1984b, in-press-a, in press-b; D. Johnson, Johnson, Pierson, & Lyons, 1984; D. Johnson, Johnson, Roy, & Zaidman, 1984; D. Johnson, Johnson, & Tiffany, 1983; D. Johnson, Johnson, Tiffany, & Zaidman, 1983, 1984; J. Johnson, 1979; R. Johnson & Johnson, 1981; R. Johnson, Johnson, DeWeerd, Lyons, & Zaidman, 1983; Lowry & Johnson, 1980; Peterson & Janicki, 1979; Peterson, Janicki, & Swing, 1981; Slavin, 1977, 1978a, 1978b; Swing & Peterson, 1982; Webb, 1980a, 1980b, 1982a, 1982b).

Under a cooperative reward structure participants will in the process of interacting make use of behavioral opportunities to facilitate the goal achievement of the group. French and associates (1977) found that at times a member of a triad ceased contributing to a tower to hold and straighten it while others continued to contribute. Rosenbaum and associates (1977) found that cooperative students totaled their contributions during the building of towers. In a collating task, subjects processed sequence cards for others (Rosenbaum, Groff, & Skowronski, 1980).

OPPOSITIONAL INTERACTION

Frequently, within competitive learning situations, there is a normative climate discouraging efforts to achieve academically. There is evidence that in the generally competitive climate of most schools, success at academic tasks has little value for many students and may even be a deterrent to popularity with peers (Bronfenbrenner, 1970; Coleman, 1961; DeVries, Muse, & Wells, 1971; Slavin, 1974; Spilerman, 1971). Large-scale surveys, furthermore, have found that competitive attitudes are unrelated to indices of peer encouragement to achieve (D. Johnson & Ahlgren, 1976; D. Johnson, Johnson, & Anderson, 1978). There is behavioral evidence that in competitive situations there is more obstruction of other students' efforts to achieve than in cooperative situations (Groff & Skowronski, 1979). Competition has been found to reduce helping and sharing (Barnett & Bryan, 1974; McGuire & Thomas, 1975) and increase antisocial tendencies (Berkowitz, 1972; Gelfand & Hartman, 1978; Rausch, 1965), and both these effects are exacerbated by losing. Finally, all of the comparative evidence cited in the section on promotive interaction indicates that there is far less promotive interaction in competitive than in cooperative situations.

NO INTERACTION

When there is no interaction among students, they have no opportunity to facilitate or obstruct each others' efforts to achieve. Within any learning situation, however, students will interact no matter how hard teachers try to prevent such interaction. The comparative evidence cited in the section on promotive interaction indicates that there are far fewer attempts to facilitate other students' efforts to achieve in individualistic than in cooperative learning situations.

SUMMARY

The positive, negative, and no interdependence found in cooperative, competitive, and individualistic learning situations result in promotive, oppositional, and no interaction patterns among students. These interaction patterns influence the motivation of students to achieve academically. The more classmates encourage and support one's efforts to achieve, and the more they facilitate one's efforts to achieve, the greater the motivation to achieve. Conversely, the greater one's conviction that classmates are discouraging, nonsupportive, rejecting, and obstructive of one's efforts to achieve, the less the achievement motivation. The more classmates are indifferent, and do not care whether one achieves or not, the lower the motivation to achieve.

The interaction patterns tend to result in different motivational systems involving:

1. Intrinsic and extrinsic motivation.
2. Subjective probability of success.
3. Incentive for achievement.
4. Epistemic curiosity and continuing motivation.
5. Commitment to organizational goals and to the organization itself.
6. Task persistence.

Each of these is discussed below.

INTRINSIC AND EXTRINSIC MOTIVATION

Intrinsic motivation may be defined as motivation that is inherent in the activity and its perceived meaning. Learning for the joy of it, to

benefit others, and as the result of meaningful feedback are intrinsic to learning activities. Extrinsic motivation may be defined as motivation for outcomes separate from and following the activity. Winning (beating the other individuals or teams) and performing up to an external criteria are extrinsic to learning activities.

COOPERATIVE GOAL STRUCTURE

The promotive interaction resulting from a cooperative goal structure tends to result in intrinsic motivation based on the joy of increasing one's understanding and competence, benefitting others, and meaningful feedback from peers. The more cooperative students' attitudes, the more they see themselves as being intrinsically motivated, persevering in pursuit of learning goals, believing that their own efforts determine their school success, wanting to be good students and get good grades, and believing that learning new ideas is important and enjoyable (D. Johnson & Ahlgren, 1976; D. Johnson, Johnson, & Anderson, 1978). There is also some experimental evidence that cooperative learning experiences, compared with individualistic ones, will result in more motivation to do schoolwork to learn interesting things, because it is fun, and because they like to (Garibaldi, 1976; D. Johnson, Johnson, Johnson, & Anderson, 1976).

Achieving to benefit others is a basic intrinsic motive. Wieseltier (cited by Kruglanski, 1978) found more intrinsic motivation among medical students who wished to help cure cancer patients than among medical students who wanted a high income. The study of medicine seemed inherently worthwhile to the former but not to the latter. When students see their own learning as of possible service to others there is intrinsic motivation.

Meaningful feedback signifies to students the extent to which they are competent at the current learning task. Such informational feedback tends to increase intrinsic motivation (Pittman, Davey, Alafat, Wetherill, & Kramer, 1980; Ryan, 1982). Students need to be able to get some sense of how they are doing at the activity to remain intrinsically interested. In cooperative learning situations, such feedback is supplied in supportive and encouraging ways by collaborators. In competitive and individualistic learning situations, feedback may be supplied by hostile or indifferent peers.

COMPETITIVE GOAL STRUCTURE

The oppositional interaction resulting from a competitive goal structure tends to result in extrinsic motivation based on winning and benefitting at the expense of others. There is evidence that the more competitive students' attitudes are, the more they see themselves as being extrinsically motivated (D. Johnson & Ahlgren, 1976; D. Johnson, Johnson, & Anderson, 1978; D. Johnson & Johnson, 1983a). In competition students place more value on winning than on performing a task well (Ames & Felker, 1979; Barnett & Andrews, 1977; D. Johnson & Johnson, 1975; Levine, 1983) and students' attention is directed on their own ability to perform or win rather than on "how" to do the task (Nicholls, 1979). Pritchard, Campbell, and Campbell (1977) found that competition decreased intrinsic motivation and face-to-face competition has been found to decrease subjects' intrinsic motivation and increase their extrinsic motivation even when there were no rewards involved (Deci, Betley, Kahle, Abrams, & Porac, 1981). There is evidence, furthermore, that competition is a

negative incentive to students, not unlike electric shock, so that students learn to escape from or terminate competition through instrumental responses (Steigleder, Weiss, Cramer, & Feinberg, 1978).

INDIVIDUALISTIC GOAL STRUCTURE

The absence of interaction resulting from an individualistic goal structure tends to promote extrinsic motivation based on reaching criteria to benefit oneself. Individualistic learning experiences, compared with cooperative ones, promote more extrinsic motivation where students do schoolwork to keep their teachers and parents pleased with them (D. Johnson, Johnson, Johnson, & Anderson, 1976).

SUBJECTIVE PROBABILITY OF SUCCESS

Students' subjective probability of success is determined by the abilities and effort available to contribute towards goal achievement and by their past history of being successful on similar academic tasks.

Insert Table 4 About Here

COOPERATIVE GOAL STRUCTURE

Multi-dimensional perceptions of ability. Cooperative learning situations have a complexity and richness that is absent in competitive and individualistic ones. In addition to contributing academic ability directly relevant to goal achievement, the efforts of group members have to be organized and coordinated, relationships among members have to be effectively managed, ideas have to be formulated and exchanged, higher level learning strategies have to be discovered and adopted, conflicts have to be resolved, and

mutual influence has to be constructively managed. Keeping each other on task, contributing and integrating information, drilling group members, encouraging elaborative thinking, and keeping materials organized are but a few of the behaviors required in effective cooperative learning groups. This complexity results in a multi-dimensional view of one's own and others' competencies. Even low ability students can promote the learning of more academically able collaborators and contribute to the effectiveness of the learning group. Students in cooperative learning situations tend to view themselves and their collaborators as having many relevant abilities to contribute (D. Johnson & Johnson, 1983a). Even when their academic performances are markedly discrepant, members view themselves and their collaborators as being similar in overall ability and deservingness of reward (Ames & Felker, 1979; Ames & McKelvie, 1982). Low-performing students feel as satisfied with their level of performance as high performers are (Ames, 1981). Low-achieving students view themselves (and are viewed by their collaborators) as competent group members who have contributed to the accomplishment of the group's learning goals (Ames, 1981; D. Johnson & Johnson, 1983a).

Joint efforts and efficacy. The effort available to contribute to goal achievement directly affects the expectations of success. In cooperative learning situations the effort available includes one's own and the effort of one's collaborators. It may be argued, furthermore, that the joint effort of a group of students on many learning tasks is more than the sum of the individual efforts of each group member. The knowledge that there is to be a team effort in achieving the group's goal provides added

confidence that the group will be successful. In addition, Johnson, Johnson, and Scott (1978) and Johnson, Johnson, Pierson, & Lyons (1983) found that cooperative learning experiences, compared with individualistic ones, promote a greater sense of personal efficacy. The more cooperative students' attitudes, the more they believe that their own efforts (rather than luck) determine their school success (D. Johnson & Ahlgren, 1976; D. Johnson, Johnson, & Anderson, 1978).

Past attributions. Once achievement situations are over, and students receive feedback about their degree of success and failure, students attribute the results to internal or external causes, stable or unstable causes, and controllable or uncontrollable causes (Weiner, Graham, Taylor, & Meyer, 1983). Past attributions affect students' current motivation to achieve. The more students view past academic success as personally caused, likely to recur, and under their control, the greater their current achievement motivation. Perceived failures reduce achievement motivation when they are interpreted as solely the responsibility of the student, unlikely to be remediable, and outside their control.

In cooperative learning situations students make attributions based on perceived own abilities and efforts, the abilities and efforts of their collaborators, and the mutual influence group members have in increasing each other's efforts. Typically, success is attributed to the joint abilities and efforts of members of their learning group. In terms of ability, there is evidence that in cooperative learning situations students tend to attribute their performance to ability (Allen, 1979; Bird, Foster, & Maruyama, 1980; Garibaldi, 1976; Gill, Ruder, & Gross, 1982; Iso-Ahola, 1977a; Iso-Ahola & Roberts, 1977; Roberts, 1975, 1978; Scanlan & Passer, 1980; Schlenker &

Miller, 1977; Stephan, Burnam, & Aronson, 1979; Stephan, Presser, Kennedy, & Aronson, 1978), and they attribute as high and even higher ability to their collaborators as to themselves (Bird & Brame, 1978; Roberts, 1975). As discussed previously, such perceptions of ability tend to be multidimensional. Similarly, members of cooperative learning groups tend to view the group's success as the result of their own and their collaborators' efforts (Bird & Brame, 1978; Bird, Foster, & Maruyama, 1980; Garibaldi, 1976; Gill, Ruder, & Gross, 1982; Iso-Ahola, 1977a, 1977b; Iso-Ahola & Roberts, 1977; Maehr & Nicholls, 1980; Roberts, 1975, 1978; Scanlan & Passer, 1980; Schlenker & Miller, 1977; Torney-Purta & Schwille, 1982). Thus, within cooperative learning situations students tend to attribute success to personal, recurring, and controllable causes.

Members of unsuccessful cooperative groups tend to attribute failure to task difficulty and bad luck (Bird, Foster, & Maruyama, 1980; Bukowski & Moore, 1980; Iso-Ahola, 1977a, 1977b; Roberts, 1975; Stephan, Burnam & Aronson, 1979; Stephan, Presser, Kennedy, & Aronson, 1978) and to a lack of effort by group members (Bird & Brame, 1978; Gill, 1980; Iso-Ahola, 1975, 1977a; Roberts, 1975; Scanlan, 1977). Because insufficient effort is perceived to be a controllable cause, it is an adaptive attribution in the face of failure and leads to greater future persistence and performance on the task (Anderson & Jennings, 1980; Andrews & Debus, 1978). Students who attribute failure to insufficient effort on the part of one's collaborators, furthermore, can be optimistic about future success since collaborators can be induced to try harder (Deutsch, 1949 b, 1962; Crombag, 1966; Raven & Eachus, 1963). There is also some evidence that cooperators

feel less responsible for their outcome when the group fails (Iso-Ahola, 1977a; Stephan, Brunam, & Aronson, 1979; Stephan, Presser, Kennedy, & Aronson, 1978), thus decreasing the possibility of demoralization.

COMPETITIVE GOAL STRUCTURE

Monopolistic perception of ability. In competitive learning situations there tends to be a monopolistic view of own and others' competence, where academic ability is the most salient characteristic on which to base expectations for success (Ames, 1978, in press; Ames & Ames, 1981; Ames, et al., 1977; D. Johnson & Johnson, 1983b). When students perceive their academic ability to be greater than their classmates', they will have a high subjective probability of success. When students perceive their academic ability to be less than their classmates', the students will have a low subjective probability of success. In other words, a social comparison process is used to determine whether one is more or less able than one's competitors. The more able one's competitors are perceived to be, the more discouraged and hopeless one tends to feel (Ames, et al., 1977; Covington & Omelich, 1979a, 1979b; Halperin & Abrams, 1978). Since only a few students can win, this monopolistic focus on academic ability tends to demoralize most students.

In competition, if one does not believe one can win, the only option is to avoid the embarrassment and humiliation of losing. This can be done by selecting unrealistic hard tasks. If competition cannot be avoided considerable anxiety may occur. Individuals will focus on their perceived incompetence, producing negative affect and interference with their capacity to employ adaptive learning or problem solving strategies (Diener & Dweck, 1978; Sarason, 1975; Wine, 1971).

Self-effort and efficacy. No matter how hard one tries, if one does not have the relevant academic knowledge or skills, one will lose. Effort, therefore, becomes of secondary importance in formulating expectations for success. There is evidence, furthermore, that competitive attitudes are significantly related to believing that luck and other external factors (rather than one's own efforts) determine school success (D. Johnson & Ahlgren, 1976; D. Johnson, Johnson, Johnson, & Anderson, 1978).

One interesting aspect of competition is that students may only exert enough effort to win, and no more. If students do not believe they can win, there is little incentive to try hard. If subjective probability of success is too high, or if one has demonstrated clear superiority to one's competitors, little effort may be exerted. Lepley (1937) conducted a relevant study. He placed two rats in a runway and rewarded the faster runner. He found that the slower runner quickly quit running at all, whereas the faster runner maintained the speed that led to success, with little evidence of enhancement of speed.

Past attributions. In competitive situations, students tend to attribute their success to superior ability (Ames, 1978, in press; Ames & Ames, 1981; Ames, et al., 1977). Winners tend to attribute the failure of other students to lack of ability (Stephan, et al., 1977; Stephan, et al., 1978; Snyder, et al., 1976; Streufert & Streufert, 1969; Wolosin, et al., 1973). Students tend to attribute failure to external factors such as luck (Covington & Beery, 1976). If failure cannot reasonably be attributed to such external factors, however, students tend to view their failure as being caused by lack of ability (Ames, 1978, in press; Ames & Ames, 1981; Ames, et al., 1977;

Carver & Scheier, 1982). The success of a competitor is often attributed to situational factors (Snyder, et al., 1976; Stephan, et al, 1977; Stephan, et al., 1978; Streufert & Streufert, 1969; Wolosin, et al., 1973). This attribution pattern will tend to result in overconfidence and lack of motivation on the part of successful students, and underconfidence and a lack of motivation on the part of unsuccessful students. As failure becomes repetitious (Hurlock, 1927) and as the rewards for success increase (Tseng, 1969), the motivation in future achievement situations of failing students decreases. When students lose in competitive situations they will repress thoughts about and avoid engaging in the learning tasks in the future in order to avoid reawakening the embarrassment and some of the failure experience (Rosenzweig, 1943). In other words, there is an ego-defensive avoidance of competitive situations in which students have previously failed.

INDIVIDUALISTIC GOAL STRUCTURE

Monopolistic perceptions of ability. In individualistic learning situations success is determined by whether students' performances reach a preset criteria of excellence. One's academic ability is the major influence on expectations for success. The academic ability of other students becomes irrelevant. It is usually assumed that the criteria for success will be tailored for each student to maximize their subjective probability of success.

Self-effort and efficacy. Since the effort of other students has no effect on students' success or failure in individualistic learning situations, only one's own effort has impact on expectations for success. Students have

to believe that they can achieve their learning goals if they try hard enough. Although much of the research indicates that ability is of primary importance in determining subjective probability of success in individualistic learning situations, there is recent evidence that when the learning goal is to improve on one's previous performance, effort becomes the dominant influence on expectations for success (Ames, in press; Covington, 1984; Heckhausen & Krug, 1982).

Past attributions. Students succeeding and failing within individualistic learning situations tend to make attributions similar to students in interpersonal competition (Ames & Felker, 1979; Nicholls, 1975). Within our culture individualistic learning situations can be quickly transformed into *ambiguous* and *ill-defined* competition.

INCENTIVE FOR ACADEMIC ACHIEVEMENT:

MUTUAL, DIFFERENTIAL, OR SELF BENEFIT

In achievement-oriented situations students are motivated to the extent that they expect themselves and their classmates to benefit or not. While incentives can be tangible, the most important incentives for learning may be a personal sense of having successfully accomplished something meaningful. The incentives offered in cooperative learning situations include contributions to both one's own and one's classmates' learning. In competitive learning situations the incentive is to demonstrate superiority over one's classmates. In individualistic learning situations the incentive is to increase one's own learning. These incentives have differential effects on students' achievement motivation.

Insert Table 5 About Here

In other words, positive, negative, and no interdependence create three different orientations toward outcomes of learning situations.

Positive interdependence promotes a learning situation in which students work together in small groups to maximize the achievement of all members, sharing their resources and providing mutual support, and celebrating their joint success. Although an external incentive such as a grade may be offered for the achievement of the group members, the incentive system is far richer due to students' perceptions that:

1. Group members are striving for mutual benefit so that all members of the groups will gain. There is recognition that what helps another group member achieve helps oneself and what promotes one's own achievement benefits the other group members.
2. Group members share a common fate where all gain or lose on the basis of the overall performance of group members.
3. The performance of group members is mutually caused by all members, so that each member is responsible for each other member's learning and obligated to each other member for their support and assistance. No member works alone. Since each member receives the encouragement and facilitation of each other member, one's own performance is perceived to be caused by one's own efforts and abilities and the encouragement and facilitation of the other group members, and the performance of the other group members is perceived to be partially due to one's encouragement and facilitation. Students view themselves as instrumental in the achievement of the other group members and view them as being

instrumental in the students' achievement. The mutual causation results in mutual responsibility for the performance of each member and mutual obligation to the assistance and support of the other group members. There is a mutual investment in each other.

4. There is a shared identity based on group membership. Besides being a separate individual, one is a member of a team. The shared identity binds members together emotionally.

5. There is an expectation for a joint celebration based on mutual respect and appreciation for the success of group members. Being part of a team effort results in feelings of comradeship, belonging, and pride. Feelings of success are shared and pride is taken in others' accomplishments as well as one's own.

Many different motives are congruent in cooperative learning situations. The desire for acceptance by and friendship with peers, the desire for increased competence and success, the desire to understand intellectually, and so forth can all be accomplished in cooperative learning situations. There may be other motives, such as the desire to be recognized as a superstar, that decrease efforts to achieve in a cooperative learning situation. Finally, there is reason to believe that it is easier to increase achievement motivation within a group than an individual setting. The more students value their membership in a cooperative learning group, the more effort students will exert to promote the accomplishment of the assigned learning goals and the greater their felt obligation to help other group members. Thus, members of groups that are evaluated as a unit become more highly motivated than do groups in which students are evaluated as individuals (Berkowitz, 1957; Berkowitz & Levy, 1956).

Negative interdependence promotes a learning situation in which students work against each other to determine who can perform the highest. The incentive is to obtain the highest score or grade. In their attempts to do so, students:

1. Strive for differential benefit where they try to gain more than the other students do. There is recognition that what helps another student hurts one's own chances of winning, and what helps one learn hurts the chances of other students to win.
2. Recognize the negatively linked fate where one gains and others lose on the basis of one's academic performance. They perceive that the fates of classmates are negatively related. They perceive that obstructing their competitors' achievement is beneficial to themselves and that their achievement creates failure for their classmates.
3. Recognize that their performance is relatively caused by the performance of oneself and one's classmates. The worse one's classmates perform, the better one's chances of winning. Thus, one's outcomes depend both on performing at a high level and not having classmates perform at even a higher level. Students do not have control over their outcomes as the learning of classmates negatively affects students' chances of winning. Classmates will not help and may even obstruct one's learning and vice versa. There is an investment in ensuring lower performance by classmates. Students feel a responsibility to perform well despite the opposition of and negative impact on classmates.

4. Recognize a relative identity based on their performance ranking within the classroom.
5. Recognize that there will be a negatively linked celebration for success because if one wins (and therefore celebrates) one's classmates lose (and therefore have no reason to celebrate). Celebrations, therefore, may involve only oneself and one's teacher and parents. Other students in the classroom will be feeling inadequate, jealous, and angry about their failure.

There is evidence that regular sport participants become more committed to winning at any cost and less committed to values of fairness and justice as their competitive experience increases (Kroll & Peterson, 1965; Loy, Birrell, & Rose, 1976; Roberts & Kleiber, 1982; Webb, 1969). There is evidence, furthermore, that competition inhibits empathic responses and that elite athletes, the ones who have weathered years of intense competition, are aloof and insensitive (Ogilvie & Tutko, 1971). Kleiber and Roberts (1981) found in a two-week study of soccer that crying occurred on three occasions as a result of perceived failure and injustice, and that quarreling took place at regular intervals with a fist fight following one game. They also found that the participants with the most competitive experience were significantly less likely to behave altruistically and significantly more likely to behave in a rivalrous manner. Kagan and Matsen (1972) also found that the emphasis on winning in organized sport may lead children to become more rivalrous in social interactions with other children.

Finally, in competitive learning situations various motives are contradictory and operate against each other. The desire to be accepted by

and friends with one's peers is directly opposed to consistent winning or losing. The contradictory pressures by various motives will tend to reduce the actual achievement oriented behavior of students in competitive learning situations.

No interdependence results in a learning situation in which students work alone to reach a preset criteria of excellence. In such a learning situations, students:

1. Strive for self-benefit to do the best they can irrespective of how their classmates perform.
 2. Recognize they share an individual fate unrelated to the fates of their classmates.
 3. Recognize that their performance is self-caused by their own ability and effort. Students feel responsibility only to themselves and are invested in only their own learning. They are obligated to the teacher but not to their classmates.
 4. Recognize that their self identity on the basis of how their performance compares with the present criteria of excellence.
 5. Expect to individually celebrate their success, with only their teacher and parents emotionally involved in their performance.
- Students will be basically indifferent to classmates' successes or failures.

Working alone does not marshal a number of motives into the service of achievement. Affiliation needs and the desire to be involved in interaction and relationships with others may operate directly against achievement in individualistic learning situations. There is, therefore, some reason to expect competing motives to decrease achievement-oriented behavior.

EPISTEMIC CURIOSITY AND CONTINUING MOTIVATION

Epistemic curiosity is motivation to search actively for more information concerning the topic being studied. The major cause of epistemic curiosity is academic disagreement and conflicts among students. Within a cooperative situation, disagreement over information, conclusions, theories, and opinions tends to lead to uncertainty, epistemic curiosity, and a reevaluation of one's conclusions. Within a competitive situation, such academic conflicts tend to result in uncertainty, a closed-minded justification of one's own conclusions, and a derogation of opposing points of view. Within an individualistic situation, there is no opportunity for disagreement and, therefore, initial conclusions are not challenged and fixation on initial impressions is common. There is considerable evidence that controversies occur more frequently and are managed in ways that promote epistemic curiosity in cooperative than in competitive or individualistic learning situations (D. Johnson & Johnson, 1979).

Beach (1974) found that small discussion groups working cooperatively consulted more books in writing papers for a college psychology course than did students in a traditional lecture-competition format. Hovey, Gruber, and Terrell (1963) found that students who participated in cooperative discussion groups during a college psychology course engaged in more serious reading to increase their knowledge and demonstrated more curiosity about the subject matter following a course experience than did students in a traditional lecture-competition course format. Smith, Johnson, and Johnson (1981) found that cooperative learning experiences, compared with individualistic ones, resulted in students being more willing to give up recess time to view a movie and students checking out more library materials

on the topic being studied. Lowry and Johnson (1980) found that in effective cooperative learning groups, compared with ineffective groups, more students gave up recess time to view a movie, and checked out materials relevant to the topic being studied from the library and from the teacher. Johnson and Johnson (in press-a) and Johnson, Johnson, and Tiffany (1983) and R. Johnson, Brooker, Stutzman, Hultman, and Johnson (1984) found that cooperative learning situations promoted a greater search for relevant information than did competitive and individualistic learning situations.

Continuing motivation is motivation to seek further information about the topic being studied in the future. Allen (1979) found that fifth-grade science students who work in cooperative learning groups demonstrated more continuing motivation than did students who were taught with a lecture-competition format. Gunderson and Johnson (1980) found cooperative learning experiences to be related to increases in continuing motivation.

ATTITUDES TOWARD THE SUBJECT BEING STUDIED

Positive attitudes toward the subject being studied and the instructional experience are necessary to sustain motivation to achieve over a period of weeks, months, and years. In the section on organizational commitment the evidence that cooperative experiences promote more positive attitudes toward the subject areas being studied and the instructional experience than do competitive and individualistic experiences. In addition, after collaborating to complete joint tasks, most individuals perceive a system where group members are jointly rewarded as being fairer than are a competitive or an individualistic reward system (Ames & Felker, 1979; Ames & McKelvie, 1982; D. Johnson & Johnson, 1983b; D. Johnson, Johnson, & Anderson, 1983).

TASK PERSISTENCE

How long individuals persist in working on a task depends largely on their intrinsic motivation to do so, their expectations that they will be successful, the nature of the incentives involved, their epistemic curiosity in and continuing motivation to learn more about the topic, and their attitudes toward the subject. Failure may be the largest deterrent to task persistence, especially if individuals believe that there are no responses in their repertoire to alter the course of failure. The more committed students are to achieving academic goals, however, the greater their task persistence. Goal commitment implies a determination to try and keep trying to achieve the goal.

In cooperative learning situations there is high intrinsic motivation, high subjective probability of success based on the combined abilities and effort of oneself and one's group members, an incentive system based on benefitting one's group members as well as oneself (and thereby providing meaning and purpose beyond self-interest), and considerable curiosity about and continuing interest in learning the assigned material. The promotive interaction pattern, furthermore, increases the likelihood of persistence on academic tasks. When students are members of work teams, with members cheering each other on, stating "do your homework for us," providing assistance and feedback whenever it is needed, and expressing pride and gratitude for the students' successes, students will persist in their learning.

In competitive learning situations winners may persist to maintain their superiority but losers will tend to stop working on the assigned

tasks. Motivation tends to be extrinsic, with a low expectation for success (unless one is a winner), an incentive system based on demonstrating superiority (which losers give up hope of doing), and a lack of intellectual curiosity about and continuing interest in learning the assigned material. The oppositional interaction pattern, furthermore, decreases the likelihood of persistence on academic tasks. When classmates are discouraging one's efforts to achieve and rejecting and resentful of one's successes, it may be easy for students to become discouraged. Persistence to achieve a learning goal will decrease when students believe that they cannot win in competition. Persistence under such circumstances only leads to increased feelings of failure and incompetence. Learning may not be perceived as being meaningful and important under these conditions.

In individualistic learning situations motivation tends to be extrinsic, with expectations for success being based monopolistically on one's ability, with an incentive system based on self-interest alone, and with a lack of curiosity about and continuing interest in learning the material. The lack of interdependence and interaction with peers makes learning "lonely," with classmates really not caring whether one succeeds or fails. Learning may not be perceived as highly meaningful and important under those conditions.

There are reasons to expect that cooperative learning situations will promote greater task persistence than will competitive and individualistic learning situations. Some evidence does exist that students' attitudes toward cooperation are positively related to liking to persevere in achieving academic goals (D. Johnson, Johnson, & Anderson, 1978).

ACHIEVEMENT

It is assumed that the greater the motivation to achieve, the higher will be the achievement. The research relating to achievement is discussed in a subsequent section of this chapter (see Table 5).

EXPECTATIONS FOR FUTURE SUCCESS

Based on the level of one's motivation to achieve and the level of success one has just experienced, one will build expectations as to how successful one will be in the future. For most individuals, cooperative experiences will promote higher expectations for future success than will competitive or individualistic experiences.

LEVEL OF PERFORMANCE

The fourth factor determining whether minority individuals voluntarily continue their membership in or drop out of an educational or career organization is their level of performance. Within colleges a major factor in whether minority students drop out is their level of achievement reflected in the mastery of theories, facts, information, and the application of that knowledge in completing assigned projects. In our studies we have found considerable evidence that cooperative learning experiences promote higher achievement than do competitive and individualistic learning experiences (Armstrong, Johnson, & Balow, 1981; Garibaldi, 1979; Humphreys, Johnson, & Johnson, 1982; D. Johnson & Johnson, 1982b, 1982d; D. Johnson, Johnson, Johnson, & Anderson, 1976; D. Johnson, Johnson, & Scott, 1978; D. Johnson, Johnson & Skon, 1979; D. Johnson, Skon, & Johnson, 1980; D. Johnson, Johnson, Roy, & Zaidman, 1984; D. Johnson & Johnson, 1980; D. Johnson, Johnson,

Tiffany & Zaidman, 1983; R. Johnson, Bjorkland, & Krotee, 1984; R. Johnson & Johnson, 1979; R. Johnson, Johnson, DeWeerd et al., 1983; R. Johnson, Johnson, Scott, & Ramolae, 1984; R. Johnson, Johnson, & Tauer, 1979; Lowry & Johnson, 1981; Martino & Johnson, 1979; Skon et al., 1981; Smith et al., 1981, 1982).

Since the 1920's there has been a great deal of research on the relative effects of cooperative, competitive, and individualistic efforts on achievement and productivity. Our work is only a small part of this research effort. Despite the large number of studies conducted, however, social scientists have disagreed as to the conclusions that may be drawn from the literature. The traditional practice seemed to be to select a subset of studies that supported one's biases, declare that they are the only studies that are relevant to the question, place them in a review, and give one's summary impressions of their findings. Michaels (1978), for example, selected ten studies to include in a review and concluded that competition promoted higher achievement than did cooperative. Slavin (1977) selected 27 studies to include in a review and concluded that cooperation promoted higher achievement than competition only if intergroup competition was included. These reviews are a classic example of the shortcomings of the summary-impression method of reviewing research literature.

In order to resolve the controversies resulting from the various reviews on social interdependence and achievement we conducted a meta-analysis of all the studies that had been conducted in the area (D. Johnson, Maruyama, Johnson, Nelson, & Skon, 1981). We reviewed 122 studies conducted between 1924 and 1981 that yielded 286 findings. Three methods of meta-analysis were used: Voting method, effect-size method, and z-score method. The results

indicate that cooperative learning experiences tend to promote higher achievement than do competitive and individualistic learning experiences. The average person working within a cooperative situation achieves at about the 80th percentile of the students working within a competitive or individualistic situation. These results hold for all age levels, for all subject areas, and for tasks involving concept attainment, verbal problem-solving, categorizing, spatial problem-solving, retention and memory, motor performance, and guessing-judging-predicting. For rote-decoding and correcting tasks, cooperation seems to be equally effective as competitive and individualistic learning procedures.

INTERNAL DYNAMICS OF COOPERATIVE LEARNING GROUPS

Despite the large number of studies comparing the relative impact of cooperative, competitive, and individualistic learning situations on achievement, the processes that mediate or moderate the relationship between cooperation and productivity has been relatively ignored. Over the past several years we have examined a number of potentially explanatory variables to illuminate the achievement related internal dynamics of cooperative learning groups. The potentially mediating or moderating variables we have studied are:

1. The type of learning task assigned.
2. The quality of learning strategy used to complete learning tasks.
3. The occurrence of controversy versus concurrence seeking when students disagree with each other while completing learning tasks.
4. The time-on-task engaged in while completing the learning tasks.

5. The cognitive processing engaged in while interacting about the learning tasks.
6. The peer regulation and feedback engaged in while interacting about the learning tasks.
7. The active involvement in learning occurring while completing the learning tasks.
8. The ability levels of group members.
9. Group cohesion.

TYPE OF TASK

In our original review of the literature (D. Johnson & Johnson, 1974, 1975) the evidence indicated that for simple, mechanical, previously mastered tasks that require no help from other students, competition promoted greater quantity of output than did cooperative or individualistic efforts. Believing that the type of task being used might be an important explanatory variable, the authors and their students conducted a series of studies examining the relative effects of cooperative, competitive, and individualistic goal structures on achievement on a variety of school related tasks (Garibaldi, 1979; D. Johnson, Johnson, & Skon, 1979; D. Johnson, Skon, & Johnson, 1980; R. Johnson & Johnson, 1979; Skon, Johnson, & Johnson, 1981). The studies focused on white first- and fifth-grade students from both urban and suburban settings and black high school students from an urban setting. The results are surprisingly consistent. On mathematical and verbal drill-review tasks, spatial-reasoning and verbal problem-solving tasks, pictorial and verbal sequencing tasks, tasks involving the comparison of the attributes of shape, size, and pattern, and a knowledge-retention task, cooperation promoted

higher achievement than did either competitive or individualistic efforts. On a specific knowledge-acquisition task both cooperation and competition promoted higher achievement than did individualistic efforts. These findings are all the more important as care was taken to optimize the constructiveness of the operationalizations of competitive and individualistic instruction.

Currently there is no type of task on which cooperative efforts are less effective than are competitive or individualistic efforts, and on most tasks (and especially the more important learning tasks such as concept attainment, verbal problem-solving, categorization, spatial problem-solving, retention and memory, motor, guessing-judging-predicting) cooperative efforts are more effective in promoting achievement. We therefore left this area of study and moved to an examination of the quality of the strategies being used in learning situations.

QUALITY OF LEARNING STRATEGY

The next potentially explanatory variable we studied was the quality of the reasoning strategy students used to complete their assignments. In a pair of studies (D. Johnson, Skon, & Johnson, 1980; Skon, Johnson, & Johnson, 1981) done in collaboration with Linda Skon we found that students in the cooperative condition used strategies superior to those used by the students in the competitive and individualistic conditions. These strategies included using category search and retrieval strategies, intersectional classification strategies, formulating equations from story problems, and formulating strategies for avoiding repetitions and errors in a spatial reasoning task. From these findings we can conclude that the

discussion process in cooperative groups promotes the discovery and development of higher quality cognitive strategies for learning than does the individual reasoning found in competitive and individualistic learning situations. In a later study (D. Johnson & Johnson, 1981a) we found that students working in a cooperative condition reported using higher thought processes than did students working individualistically.

CONTROVERSY VERSUS CONCURRENCE-SEEKING

Involved participation in cooperative learning groups will inevitably produce conflicts among the ideas, opinions, conclusions, theories, and information of members. When such controversies arise, they may be dealt with constructively or destructively, depending on how they are structured by the teacher and the level of social skills of the students. We have conducted a series of studies (D. Johnson & Johnson, 1984a; D. Johnson, Johnson, Pierson, & Lyons, 1983; D. Johnson, Johnson, & Tiffany, 1984; R. Johnson, Brooker, Stutzman, Hultman, & Johnson, 1984; Lowry & Johnson, 1981; Smith, Johnson, & Johnson, 1981) and reviewed the research literature (D. Johnson, 1980; D. Johnson & Johnson, 1979) on controversy. When managed constructively, controversy promotes epistemic curiosity or uncertainty about the correctness of one's views, an active search for more information, and consequently, higher achievement and retention of the material being learned. Individuals working alone in competitive and individualistic situations do not have the opportunity for such a process and, therefore, their achievement suffers.

TIME ON TASK

Another possible explanation for the superiority of cooperation in pro-

moting higher achievement than do competitive or individualistic efforts is that students in cooperative learning groups spend more time-on-task than do students in competitive and individualistic learning situations. In a number of studies we observed the amount of on-task time in the three types of learning situations (Nevin, Johnson, & Johnson, 1982; D. Johnson & Johnson, 1981a, 1982; D. Johnson, Johnson, Roy, & Zaidman, 1982; R. Johnson & Johnson, 1981, 1982). Our results indicate that in two of the studies more on-task behavior was found in the cooperative condition, while in four of the studies no significant difference in on-task behavior was found. From these results it may be concluded that cooperative learning situations may promote more on-task behavior than the other two goal structures, but probably there is little difference in observed actual on-task behavior among the three goal structures.

COGNITIVE PROCESSING

One of the most promising mediating variables identified in our meta-analysis (D. Johnson, et al., 1981) as explaining part of the relationship between cooperation and achievement was the oral rehearsal of the information has been found to be necessary for the storage of information into memory, as promoting long-term retention of information, and as increasing achievement. Two of our students, Virginia Lyons (1982) and Patricia Roy (1981) developed an observational instrument that measured the amount of lower-level (repetition of information), intermediate-level (stating of new information), and high-level (explanations, rationales, integration) rehearsal within learning situations. The results of our studies (D. Johnson & Johnson, 1982c; D. Johnson, Johnson, Pierson, & Lyons, 1983; D. Johnson,

Johnson, Roy, & Zaidman, 1984; R. Johnson, Johnson, DeWeerd, Lyons, & Zaidman, 1982; R. Johnson, Johnson, Scott, & Ramolae, 1984) indicate that cooperative efforts contain more low-, intermediate-, and high-level oral rehearsal of information by low-, medium-, and high-ability students than do individualistic efforts. The results also indicate that within the cooperative condition, intermediate-level oral rehearsal was related to achievement.

PEER SUPPORT, REGULATION, AND FEEDBACK

A number of studies have found more peer regulation, feedback, support, and encouragement of task-related efforts in cooperative than in individualistic learning situations (D. Johnson & Johnson, 1982a, 1984a, in press-a; D. Johnson, Johnson, Roy, & Zaidman, 1983; D. Johnson, Johnson, Tiffany, & Zaidman, 1983). Such peer interaction is often viewed as important for task engagement and for the motivation of less "mature" learners (who may need an external agent to provide more guidance and monitoring of their progress through the steps required to complete a task). This topic has been previously discussed in an earlier section of the chapter.

ACTUAL MUTUAL INVOLVEMENT IN LEARNING

Cooperative learning situations promote a mutual active oral involvement in learning situations within which students work silently on their own. Within a cooperative learning situation, students are required to discuss the material being learned with one another (D. Johnson & Johnson, 1982d; D. Johnson, Johnson, Pierson, & Lyons, 1984; D. Johnson, Johnson,

Roy, & Zaidman, 1983; D. Johnson, Johnson, Tiffany, & Zaidman, 1983; R. Johnson, Johnson, Scott, & Ramolae, 1984). During the studies we directly observed the active oral involvement of students in completing assigned learning tasks. There is considerable more active oral involvement in cooperative than in individualistic learning situations. The active engagement of providing task-related information was found to be significantly correlated with achievement in the cooperative condition.

There is evidence that the more cooperative students' attitudes are, the more they express their ideas and feelings in large and small classes and the more they listen to the teacher, whereas competitive and individualistic attitudes are unrelated to indices of active involvement in instructional activities (D. Johnson & Ahlgren, 1976; D. Johnson, Johnson, & Anderson, 1978). There is evidence that cooperative learning experiences, compared with competitive and individualistic ones, result in a greater desire to express one's ideas to the class (D. Johnson, Johnson, Johnson, & Anderson, 1976; Wheeler & Ryan, 1973). Cooperative learning experiences, compared with competitive and individualistic ones, promote greater willingness to present one's answers and thus create more positive feelings toward one's answers and the instructional experience (Garibaldi, 1978; Gunderson & Johnson, 1980).

ABILITY LEVELS OF GROUP MEMBERS

Another potentially mediating variable within cooperative learning groups is the interaction among students from diverse ability levels. There may be an important advantage to having high-, medium-, and low-ability students work together on completing assignments and learning material. A

number of our studies have compared the achievement of high, medium, and low ability students involved in cooperative learning activities with the achievement of their counterparts working alone individualistically or competitively (Armstrong, Johnson, & Balow, 1981; D. Johnson, Johnson, Roy & Zaidman, 1983; Martino & Johnson, 1979; Nevin, Johnson, & Johnson, 1982; Smith, Johnson, & Johnson, 1981, 1982; Skon, Johnson, & Johnson, 1981). There can be little doubt that the low and medium ability students especially benefit from working collaboratively with peers from the full range of ability differences. There is also evidence that high ability students are better off academically when they collaborate with medium and low ability peers than when they work alone; at the worst, it may be argued that high ability students are not hurt by interacting collaboratively with their medium and low ability classmates. One of the important internal dynamics of cooperative learning groups, therefore, may be the opportunity for students with different achievement histories interacting with one another to complete assigned learning tasks.

GROUP COHESION

Within cooperative learning groups members typically develop considerable liking for each other and attachment to being a member of the group (D. Johnson, Johnson, & Maruyama, 1982). These positive feelings toward the group and the other members may have a number of important influences on motivation to achieve and actual achievement.

HIGHER LEVEL ANALYTICAL REASONING

In many subject areas related to science and technology the teaching of facts and theories is considered to be secondary to the teaching of

analytical thinking and the use of higher level reasoning strategies. The aim of science education, for example, has been to develop individuals "who can sort sense from nonsense," or who have the analytical thinking abilities of grasping information, examining it, evaluating it for soundness, and applying it appropriately. The superiority of cooperation over competitive and individualistic efforts in promoting achievement on problem-solving and reasoning tasks (D. Johnson, Maruyama, et al., 1981) indicates that cooperation may promote more analytical thinking. We have found in our own studies that students in cooperative learning situations use higher level reasoning strategies than do students in competitive and individualistic learning situations (D. Johnson & Johnson, 1981a; D. Johnson, Skon, & Johnson, 1980; Skon et al., 1981).

COLLABORATIVE COMPETENCIES

The sixth factor affecting the success of minority individuals in educational and career organizations is their competence in collaborating with others. Collaborative competencies are the keystone to building and maintaining stable marriages, families, careers, and friendships. Being able to perform technical skills such as reading, speaking, listening, writing, computing, and problem solving are of little use if the person cannot apply those skills in cooperative interaction with other people. Colleges have been places that promoted unrealistic expectations of what career, family, and community life may be like. Most careers do not expect people to sit in rows and compete with colleagues without interacting with them. Team work, communication, effective coordination, and divisions of labor characterize more real life settings.

In 1982 the Center for Public Resources published Basic Skills in the U.S. Workforce: The Contrasting Perceptions of Business, Labor, and Public Education. This study was a nationwide survey of businesses and industries that had annual 1980 sales of greater than \$100 million and that employed at least 500 employees, of major labor unions, and of public educational institutions in all parts of the country. Businesses, labor unions, and schools were in agreement that collaborative skills were important in employment retention. Terminations due to lack of basic and technical skills were not frequently reported, but terminations due to poor job attitudes, interpersonal relationships, behavior, or dress accounted for 90 percent of terminations. Career advancement, however, seemed to be severely restricted for adults who were deficient in technical and basic skills.

A basic requirement for employability, and career progression, is the ability to work effectively with others to perform a task and solve problems. Engineers and other high tech personnel must now, more than ever, work with other scientists and technicians as well as economists, government officials, etc., to reach satisfactory and mutually acceptable designs for future technology. All engineers, for example, must be capable of communicating with and working with people of other professions to solve interdisciplinary problems. A number of studies have documented that collaborative competencies are essential for successful engineering careers (Smith, Johnson, & Johnson, 1981b).

Technical and scientific knowledge are of no use if a student cannot apply them in cooperative interaction with other people. It does no

good to train an engineer if the person cannot work effectively with other people and contribute what they know to joint efforts and maintain a job as an engineer or secretary after they have finished school. The industrial strategy of Japan is a good illustration of this principle. Japanese management has been quoted as stating that the superiority of the Japanese industrial system is not based on the fact that their workers are more intelligent than are the workers of other countries, but that their workers are better able to work in harmony and cooperation with each other. Obviously, the studies noted above in the section on promotive interaction indicate that students in cooperative learning situations learn more collaborative skills than do students learning competitively or individualistically. These skills, furthermore, have been demonstrated to transfer to new situations (R. Johnson & Johnson, 1982a).

SOCIAL NETWORKING

An important aspect of career progression patterns is the building of coalitions with ambiguous and competent individuals to mutually advance each other's careers. The relationships formed within a training program can have important consequences for one's career success. The way in which interaction among employees in high tech companies is structured will determine the opportunity for social networking. The evidence reviewed as to the impact of cooperative, competitive, and individualistic learning experiences are more effective in providing opportunities for networking with colleagues.

PSYCHOLOGICAL STABILITY

When students finish school it is important that they have the psychological stability to build and maintain career, family, and community relationships and perceive a basic and meaningful interdependence with other people. We have conducted two correlational studies directly relating cooperative, competitive, and individualistic attitudes with a wide variety of measures of psychological health, one focusing on high school seniors (D. Johnson & Norem-Hebeisen, 1977) and one focusing on imprisoned adolescents and adults (James & Johnson, 1982). We found cooperativeness to be positively related to numerous indices of psychological health such as emotional maturity, well-adjusted social relations, strong personal identity, and basic trust in and optimism about other people, competitiveness to be positively related to a few indices of psychological health, and individualistic attitudes to be related to numerous indices of psychological pathology, emotional immaturity, social maladjustment, alienation, and self-rejection. While all of this evidence is correlational, it does provide some indication of the possible long-term impact of the three types of social interdependence and points toward individualistic efforts, where students are isolated and disconnected from one another, as being the instructional strategy most potentially damaging to psychological health.

VALUE OF COMPETITIVE AND INDIVIDUALISTIC SKILLS

Despite the research results indicating the efficacy of cooperatively structured situations reviewed in this chapter, the authors are committed to the ideal that individuals develop competencies in all three types of

situations. Competing successfully on one's own when they are appropriate are important competencies to acquire and maintain.

APPLICATIONS

The use of cooperative learning situations is not new to American education. While there is a definite place for interpersonal competition and individualistic work in the classroom and in economic and military organizations, for at least the past three decades cooperation has been underemphasized. Over the past ten years we and our colleagues have trained over 25,000 teachers and professors in the procedures to implement the integrated use of cooperative, competitive, and individualistic learning experiences. We have built an international network of school districts and colleges involved in the long-term efforts to implement cooperative learning. Within the United States these educational organizations range from California to Maine, from Florida to Alaska, and from Texas to the Dakotas. In Canada we have worked with educational organizations from British Columbia to Quebec, and there are active school districts and colleges in Norway, Sweden, and Australia. In educational organizations, there are a set of basic elements we recommend be always included in any cooperatively structured learning activity:

1. Positive interdependence. This may be achieved through mutual goals (goal interdependence); divisions of labor (task interdependence); dividing materials, resources or information among group members (resource interdependence); assigning students roles (role interdependence); and/or by giving joint rewards (reward interdependence). In order for a learning situation to be

cooperative, students must perceive that they are positively interdependent with the other members of their learning group.

2. Face-to-face interaction among students. There is no magic in positive interdependence in and of itself. It is the interaction patterns among students promoted by the positive interdependence that promotes instructional and socialization outcomes.

3. Individual accountability for mastering the assigned material.

The purpose of a learning situation is to maximize the achievement of each individual student. Feedback mechanisms for determining the level of mastery of each student are necessary for students to provide support and assistance to each other.

4. Appropriate use of interpersonal and small group skills. Placing socially unskilled students in a learning group and telling them to cooperate will obviously not be successful. Students must be taught the social skills needed for high quality collaboration and be motivated to use them. These skills are detailed in

D. Johnson (1981) and D. Johnson and F. Johnson (1982).

We additionally recommend that students periodically be given time and a structure for analyzing how well their learning groups are functioning and that cooperatively structured lessons are supplemented with appropriate competitive and individualistic ones. The specific components of the teacher's role are identified in D. Johnson and Johnson (1975).

Working in a group setting does not always lead to increases in motivation. The less the individual accountability and the larger the group size, the lower the effort of some students to achieve the learning

goal. As group size increases and groups work on tasks where it becomes increasingly difficult to identify members' contributions, the less some members will try to contribute to goal achievement (Ingham, Levinger, Graves, & Peckham, 1974; Latane, Williams, & Harkins, 1979; Moede, 1927). If, however, there is high individual accountability and it is clear how much effort each member is contributing, then the social loafing effect vanishes (Kerr & Bruun, 1981; Williams, Harkins, & Latane, 1981).

When members of a learning group see their efforts as dispensable for the group's success, they may reduce their efforts (Kerr & Bruun, 1983; Harkins & Petty, in press; Kerr, 1983; Sweeney, 1973). A perception that one's efforts are not needed increases as the size of the group increases and as collaborators' efforts make one's own efforts unnecessary (such as when the highest score determines the group's grade and there are other students far more able than oneself. As group size increases, the probability increases that someone else in the group will perform in ways that make one's efforts dispensable. When other members decrease their efforts to achieve, furthermore, demoralization may result so that high achieving students believe that they are being taken advantage of and therefore they decrease their efforts so as not to provide undeserved rewards for irresponsible and ungrateful "free-riders" (Kerr, 1983).

When group size is appropriately small, individual accountability is clear, the task is structured so that the efforts of all members are needed for group success, face-to-face interaction is present, the positive interdependence is apparent, and students have the necessary interpersonal skills, then there will be an absence of social loafing and free-rider effects on achievement motivation.

SUMMARY

The success of minority students in high tech educational and career organizations depends on their being integrated into constructive and supportive relationships with peers and superiors, developing commitment to organizational goals and to the organization itself, having high achievement motivation, performing at a high level, developing high level analytical reasoning skill, acquiring collaborative competencies, forming coalitions with other ambitious and competent peers, and developing a basic psychological stability. Structuring learning and work situations cooperatively is a basic aspect of promoting the educational and career success of minority individuals.

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FIGURE 1: SOCIAL JUDGMENT PROCESS

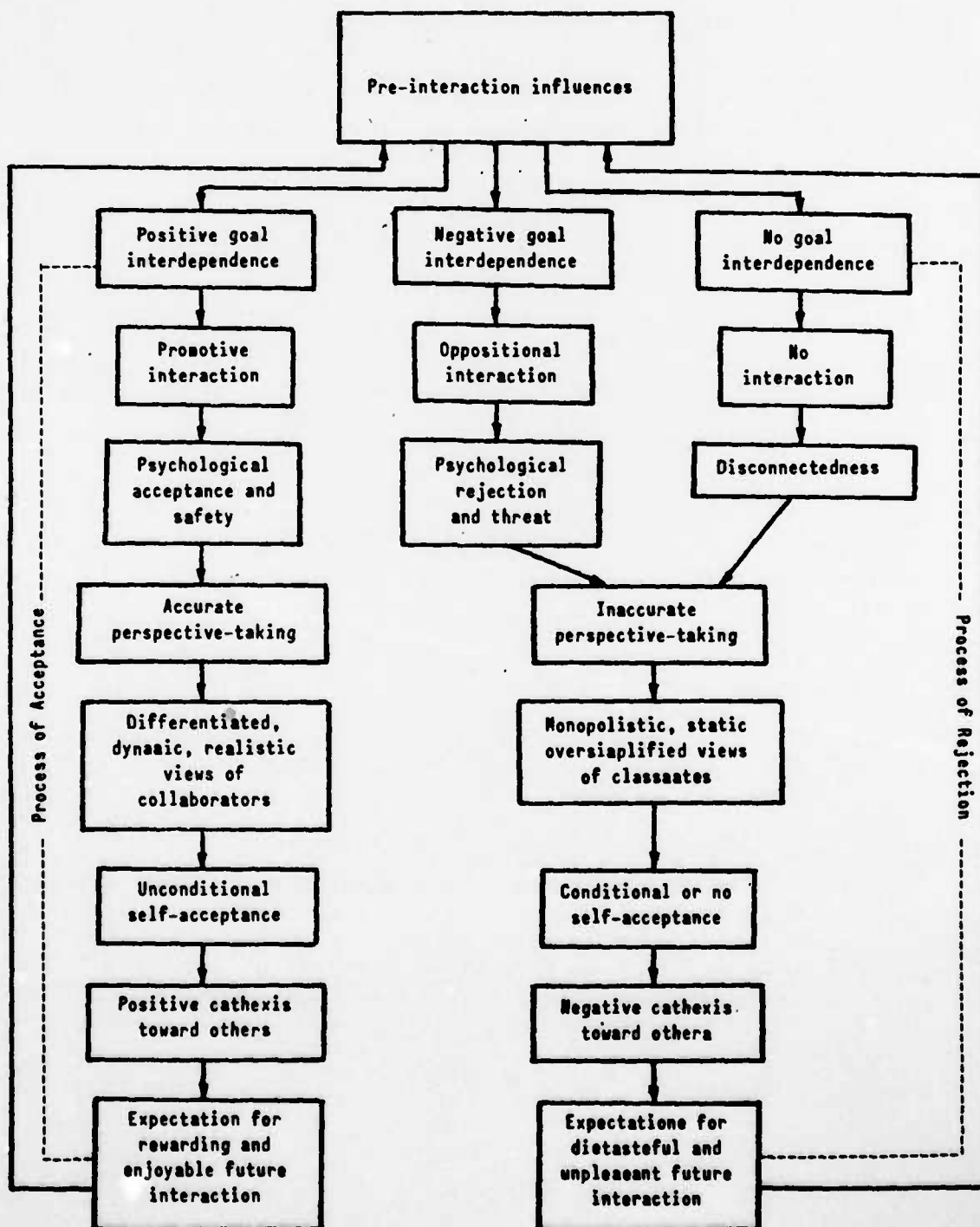


TABLE 1

ATTRACTION META-ANALYSIS: CROSS-ETHNIC FINDINGS

	Voting			Effect size		z-score			
	N	ND	P	M	SD	N	z	N	Fail-safe <i>n</i>
Cooperative vs. group competitive	0	1	0	—	—	—	—	—	—
Cooperative vs. competitive	1	24	29	.54	.50	42	10.33	42	1,617
Group competitive vs. competitive	0	11	18	.40	.13	7	9.15	17	509
Cooperative vs. individualistic	0	5	22	.68	.41	17	10.08	19	695
Group competitive vs. individualistic	0	1	3	.60	.18	2	5.36	3	29
Competitive vs. individualistic	1	2	4	.21	.71	7	3.05	7	17

Note. A positive finding favors the first goal structure of each pair; a negative finding favors the second goal structure of each pair.

TABLE 2

ATTRACTION META-ANALYSIS: TOTAL FINDINGS

	Voting			Effect size		z-score			
	N	ND	P	M	SD	N	z	N	Fail-safe n
Cooperative vs. group competitive	3	3	14	1.10	1.98	12	8.06	16	419
Cooperative vs. competitive	1	29	73	.77	.66	71	20.09	77	11,408
Group competitive vs. competitive	0	19	23	.57	.62	14	12.17	30	1,611
Cooperative vs. individualistic	2	12	82	.97	.87	6	20.94	62	10,028
Group competitive vs. individualistic	3	10	13	.72	1.75	11	9.93	15	531
Competitive vs. individualistic	1	15	4	.14	.52	5	2.56	14	20

Note. Several studies contained both cross-ethnic data and mainstreaming data or mainstreaming data and homogeneous data. When conducting the meta-analysis for the total findings, they were included only once, and therefore there are nonsumming *n*'s in this table.

FIGURE 2

SOCIAL INTERDEPENDENCE AND ACHIEVEMENT MOTIVATION

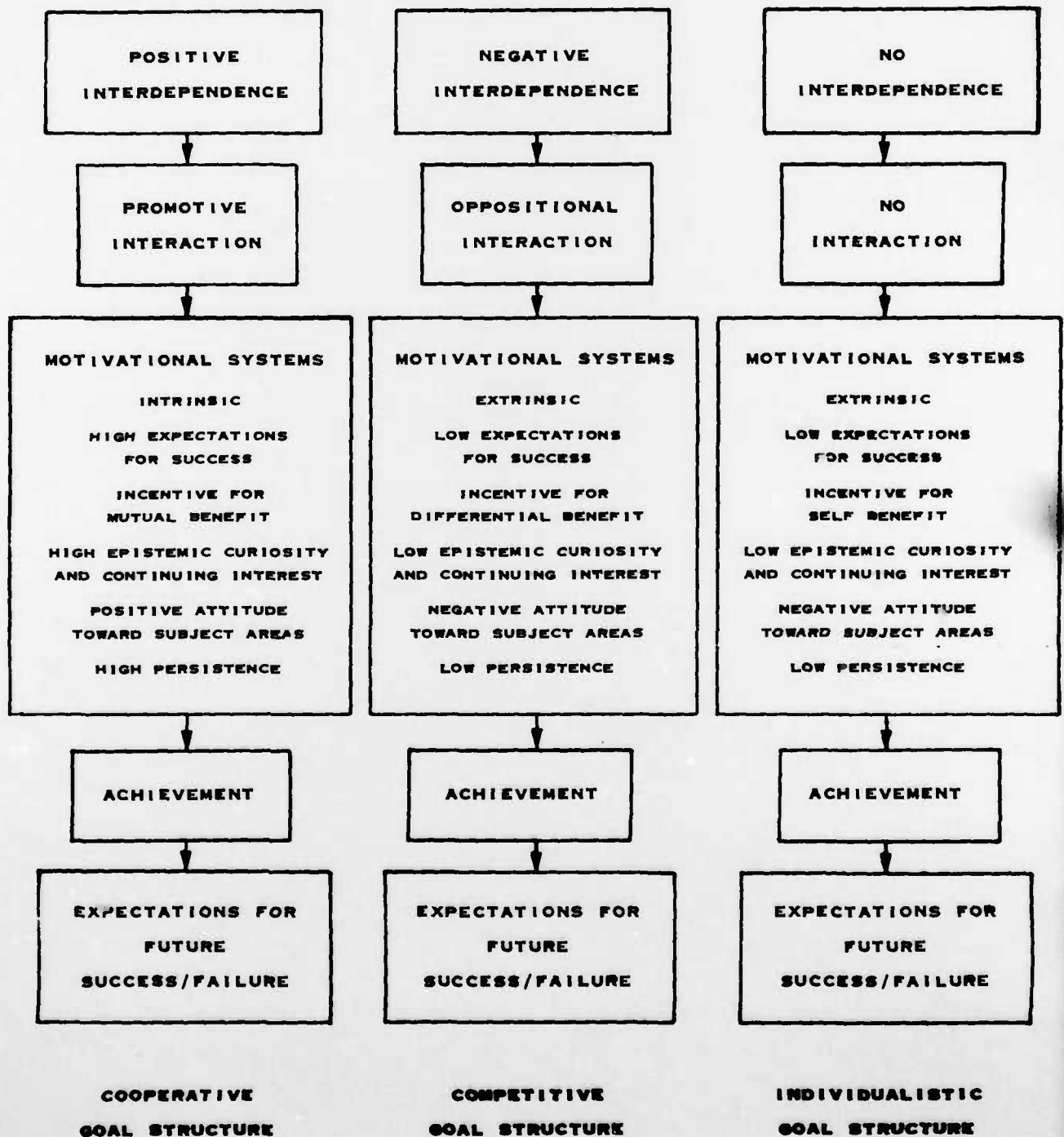


TABLE 3

EXPECTATIONS FOR SUCCESSFUL ACHIEVEMENT

	Cooperative	Competitive	Individualistic
Own Academic Abilities	+	+	+
Own Related Abilities	+	0	0
Others' Academic Abilities	+	-	0
Others' Related Competencies	+	0	0
Own Effort	+	+	+
Others' Effort	+	-	0
Previous History	+	+ or -	+ or -

TABLE 4

INCENTIVES FOR ACADEMIC ACHIEVEMENT

<u>Cooperative</u>	<u>Competitive</u>	<u>Individualistic</u>
Mutual Benefit	Differential Benefit	Self Benefit
Common Fate	Negatively Linked Fate	Individual Fate
Mutual Causation	Relative Causation	Self Causation
Shared Identify	Relative Identity	Self Identity
Joint Celebration	Negatively Linked Celebration	Self Celebration

TABLE 5
ACHIEVEMENT META-ANALYSES

Conditions	Method								
	Voting			Effect size			z score		
	N	ND	P	M	SD	N	z	N	Fail-safe n
Cooperative vs. group competitive	3	6	4	.00	.63	9	.16	13	
Cooperative vs. competitive	8	36	65	.78	.99	70	16.00	84	7,859
Group competitive vs. competitive	3	22	19	.37	.78	16	6.39	31	430
Cooperative vs. individualistic	6	42	108	.78	.91	104	24.01	132	27,998
Group competitive vs. individualistic	1	10	20	.50	.37	20	11.37	29	1,356
Competitive vs. individualistic	12	38	9	.03	1.02	48	4.82	50	380

Note. N = negative; ND = no difference; P = positive.

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